

LIGHT, MODERATE AND HEAVY DRINKERS IN SLOVAKIA: HOW THEY RESPOND TO HIGHER ALCOHOL PRICES?

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Abstract: In recent years WHO published several global reports about alcohol consumption including suggestions for reducing alcohol consumption. The main aim of this effort is decreasing of alcohol consumption globally about 10 % by 2025. They presented several policy options like taxation, bans on alcohol advertising and restrictions on the physical availability of retailed alcohol. Since alcohol consumption in Slovakia is in the top 10 in the world ranking and drinking pattern are according to OECD medium risky and there is huge inequality in distribution of alcohol consumption we decided to analyse how different drinking groups e.g. light, moderate and heavy drinkers respond to price change. Results confirms that heavy drinkers are less price sensitive than light and moderate drinkers, therefore reducing of alcohol consumption in Slovakia cannot be done only by taxation, but other supporting tools like sales restrictions and advertisement bans must be involved.

Keywords: alcohol, price elasticity, quantile regression

JEL Classification: C21, I10 Q11

INTRODUCTION

Every year alcohol caused 3 million deaths all around the world and a quarter of them are women. (WHO, 2018). In 2016, 57 % of the world population consumed alcohol and in Europa it was almost 60 %, what is the highest percentage of drinkers in the world. In European region is consumed more than a fifth of world alcohol consumption with average yearly per capita consumption about 10 litres (WHO, 2018). In Slovakia is it even more. Between 2008 – 2013 was average alcohol consumption about 13 litres of pure alcohol per capita thanks to which was Slovakia on 10th place in world ranking of countries by alcohol consumption (WHO, 2014).

World Health Organization in the newest Global status report on alcohol and health sets a target of a 10 % relative reduction of alcohol consumption worldwide by 2025. To achieve this aim presents policy options and interventions focused on reducing the harmful use of alcohol. As the most cost-effective actions suggest tax increasing, bans on alcohol advertising and restrictions on the physical availability of retailed alcohol (WHO, 2018).

Since alcohol consumption in Slovakia belongs to the highest and taxation is often used as a main instrument for decreasing consumption of alcoholic beverages, the aim of our research is find out how different drinking groups e.g. light, moderate and heavy drinkers respond to the price change.

1. LITERATURE REVIEW

Generally, alcohol consumption in former communist countries of Central Europe is relatively high. Ukraine is ranked 6th, Hungary 8th, Czech Republic 9th, and Poland 14th in the world ranking of per capita alcohol consumption (Tab. 1). Beer consumption represents 55 % in Poland and 54 % in Czech Republic and Germany. France is mostly wine oriented (56 %). Spirits represent the dominant share on alcohol consumption in Ukraine (48 %) and Slovakia (46 %), WHO (2014).

Consumption of alcohol in Slovakia is about 443 million litres of beer, 79 million litres of wine and 52 million litres of spirits annually. Spending on alcohol in 2016 was more than 1 billion EUR, what represents 1.3 % of Slovakia's GDP (Eurostat, 2017). If we look at alcohol consumption on household's level, average consumption is 50 litres of beer, 14.5 l of wine and 6.4 l of spirits. 3 % of total consumption expenditure are spent on alcohol what is 270 EUR yearly (SOSR, 2018; Eurostat, 2018).

Tab. 1: Alcohol consumption in selected countries

Country	Ranking	Total consumption (l of pure alcohol) Average 2008-2010	Share on consumption			
			Beer	Wine	Spirits	Other
Ukraine	6.	13,9	40%	9%	48%	3%
Hungary	8.	13,3	36%	30%	34%	0%
Czech Republic	9.	13,0	54%	20%	26%	0%
Slovakia	10.	13,0	30%	18%	46%	6%
Poland	14.	12,5	55%	9%	36%	0%
France	18.	12,2	19%	56%	23%	2%
Germany	23.	11,8	54%	28%	18%	0%
Austria	36.	10,3	50%	36%	14%	0%

Source: WHO Global status report on alcohol and health, 2014

Also pattern of drinking in Slovakia is by OECD valuated as medium risky, while in Austria or Germany is the least risky. This indicator includes attributes like quantity of alcohol consumed per occasion, festive drinking or drinking with meals. So, it tells more about how people drink, not just how much. Distribution of alcohol consumption in population is more unequal in Central Europe than in West Europe. While in France 20 % of people are responsible for a half of overall alcohol consumption, in CE is more than 75 percent of total alcohol drunk by a fifth of population.

Studies focusing on price elasticity of demand for alcohol have two major reasons (Blaylock and Blisard, 1993). Firstly, there are health consequences of drinking. Combination of medium risky factor of drinking and huge inequality of alcohol consumption in Slovakia leads to significantly negative health and social consequences. Alcohol caused 7.5 percent of all deaths in Slovakia (Petrovic, 2015). It a cause of 48 % of liver cirrhosis, 27 % of traffic injuries, 26 % of mouth cancers, 26 % of pancreatitis, 20 % of tuberculosis, 18 % of suicides, 18 % of interpersonal violence, 13 % of epilepsy and many more (WHO, 2018). All these negative consequences are mostly connected with heavy drinking. But are there any benefits of drinking? Baum-Baicker (1985) mentioned that light or moderate drinking may be beneficial to overall psychological well-being. Similar benefits mentioned Dyer et al. (1980) and Klatsky et al. (1981). Unfortunately, almost 46 % of Slovak drinking men are heavy drinkers and only 6.6 % are abstainers or very light drinkers (Popova, et al. 2007). Based on this, tools aimed to decrease the impact of alcohol on society and health must be mostly focus on heavy drinkers.

Secondly, alcohol demand studies are conducted to find out how taxation affect consumption of alcoholic beverages. Many of these studies confirm that higher taxes on alcohol and therefore higher price reduce alcohol consumption and decrease consequences of drinking (Farrell, Manning, Finch, 2002, Andrienko, Nemtsov, 2005, Jiang et al., 2016). But, we need to consider that alcohol is an addictive goods and drinkers with higher level of consumption could be less sensitive to price change (Andrienko, Nemtsov, 2005, Fogarty, 2006, Ayyagari et al. 2013). Also, Saffer, Dave, Grossman (2012) show that heavy drinkers are less responsive to price changes than moderate drinkers. Manning, Blumberg, Moulton, 1995 found that heavy drinking is less price elastic than moderate or light drinking, even upper fifth percentile of drinkers have elasticity not statistically significant from zero. In this case, tax increase may reduce mostly light and moderate drinking and not the problematic heavy drinking.

We assume that the price increase does not have a sufficient impact on the reduction in consumption of alcohol among heavy drinkers who are responsible for the most alcohol consumption in Slovakia. Still

there are studies confirming that they are more influenced by advertising (Manning, Blumberg, Moulton, 1995), eliminating access to low-cost alcohol (Murphy, MacKillop, 2006) or in the case of youth by the legal drinking status (Cook, Moore, 1995).

2. DATA AND METHODOLOGY

For estimating price elasticities of light, moderate and heavy consumption of alcoholic beverages we used quantile regression on data from Household Budget Survey of Slovakia for years 2006 – 2012. Data were processed in STATA software.

As the main dependent variable, we used number of standard drinks per 1 adult person in the household and per day, based on work of Ayyagari et al. (2013). As a standard drink we consider 0.5 l beer, 0.2 l wine or 0.05 l spirits. The dataset doesn't include prices of alcoholic beverages, therefore we follow calculation method used by Sousa, 2014. We divided expenditure on alcohol by quantities of alcohol consumed by household. For the households with zero consumption and therefore zero prices we calculated average prices for 8 regions in Slovakia by quarter and year and substitute the missing prices with the average prices. Other variables used for capturing socio-demographics characteristic are shown in Tab. 2.

Tab. 2: Variables used in the model

Dependent variable	Definiton
s_drinks	number of standard drinks per 1 adult and day
Explanatory variables	Definiton
price_spirits	real price of spirits per litre
price_wine	real price of wine per litre
price_beer	real price of beer per litre
ln_income	log income of household
ln_eq_exp_total	log equalised total monthly expenditure of household in EUR
age_hh	age of head of household
age_hh_sq	age of head of household squared
smoking	dummy variable, 0 – household has zero expenditure on tobacco, otherwise 1
male_hh	dummy variable, gender of head of household man – 1, woman – 0
education	dummy variables for primary, secondary and university education
Year	trend for period 2006 – 2012
Region	dummy variables for 8 regions of Slovakia
n_adults	number of family member older than 18 years (national legal minimum age for sales of alcoholic beverages)
employed_hh	dummy variables for work status of head of household, employed – 1, unemployed and economically inactive person – 0

Source: Household Budget Survey, NBS

2.1. Quantile regression

We used quantile regression because it is very likely that price elasticity varies across quantiles – from households with the lowest number of standard drinks consumed to heavy drinking households. Rizov et al. (2014) and Cupak et al. (2016) used similar model for analysing differences in household's food demand. Quantile regression is also more robust method because it is not sensitive to normality of error distribution or to the outliers in the data.

Model for quantile regression:

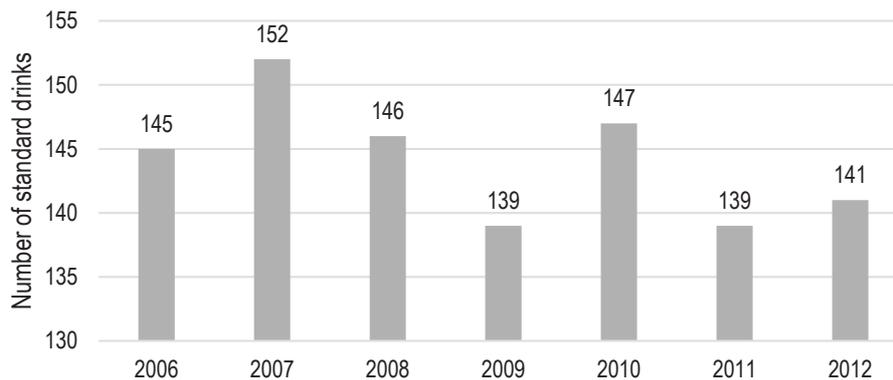
$$\log Y_j = \log P_j \varepsilon_\theta + X_j \beta_\theta + u_{\theta j} \quad (1)$$

where Y_j is dependent variable, P_j represents prices X_j represent other explanatory variables, ϵ_θ is elasticity in θ quantile of dependent variable and $u_{\theta t}$ is an error term.

3. RESULTS

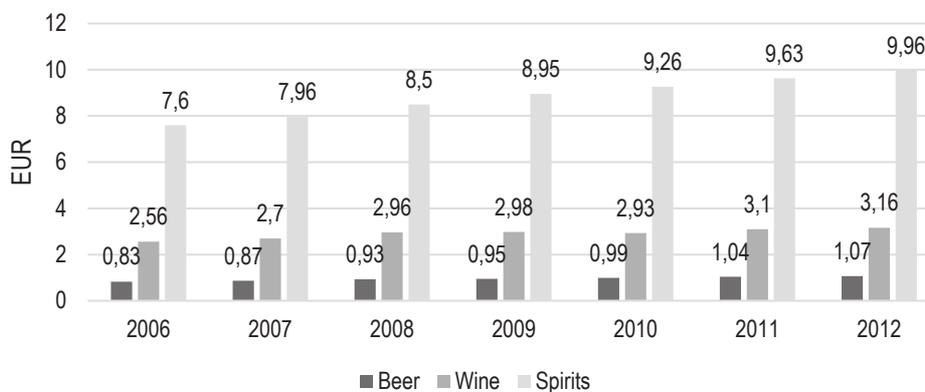
Between years 2006 and 2012 average adult member consumed in average 144 standard alcoholic drinks yearly. The highest consumption was in 2007 (152 standard drinks) and the lowest in 2009 (139 standard drinks). Details are on Fig. 1. Average prices for beer, wine and spirits (Fig. 2) have increasing trend since 2006. Price of beer increased by 29 %, price of wine by 23 % and the highest increase occur in price of spirits (31 %). Average price was 0.95 EUR per l of beer, 2.91 EUR per l of wine and 8.85 EUR per l of spirits.

Fig. 1: Annual sum of standard drinks consumed per adult household member



Source: authors' calculations

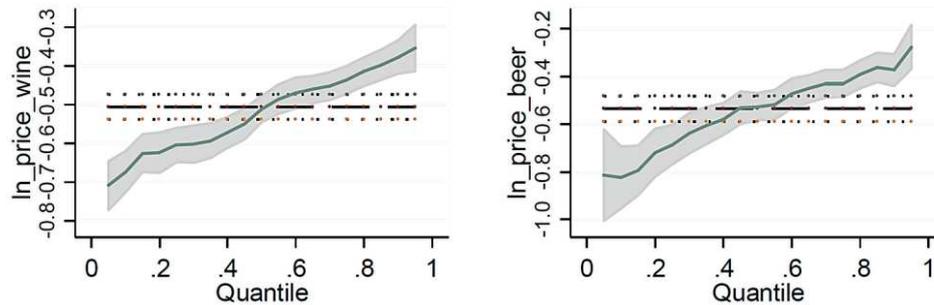
Fig. 2: Average prices for beer, wine and spirit between 2006 and 2012



Source: authors' calculations

Price elasticity of demand for wine and beer has comparable trend. Demand for both alcoholic beverages is inelastic for all drinking groups. It means that 1 % increase in price of wine or beer causes less than 1 % decrease in alcohol consumption. Also, price increase of wine and beer mostly decrease consumption of light and moderate drinkers. With rising number of standard drinks consumed price elasticity of demand for wine change from -0.7 to -0.35 and for beer from -0.8 to -0.29.

Fig. 3: Price elasticity of demand for wine and beer different drinking groups

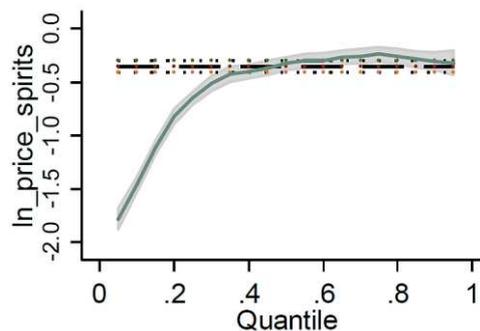


Source: authors' calculations

Fig. 4 shows how is elasticity for spirits changing with raising number of drinks consumed. Households with the lowest consumption of alcohol are sensitive mainly on price change of spirits. One percent increase in price of spirits may cause 1.75 % decrease in alcohol consumption. But with more alcohol consumed this sensitivity on price of spirits is falling sharply to 0.24 % decrease in consumption caused by 1 % increase in price. For the heaviest drinkers (99 % quantile) price elasticity rises a little (0.39 % decrease with 1 % increase in price of spirits).

This occurs only in the case of change in the price of spirits and it can be caused by fact that heavy drinkers consume mostly spirits, so they respond a little bit more to the price change of the spirits than to the price change of wine which is constantly declining or to the price change of beer.

Fig. 4: Price elasticity of demand for spirits across different drinking groups



Source: authors' calculations

CONCLUSION

We estimated price elasticity with quantile regression based on standard drink consumed by one adult member of household per day and we focused on how price elasticity change across light, moderate and heavy drinkers with change in price of beer, wine and spirits. Standard drink is specified as 0.5l beer, 0.2l wine or 0.05l spirit.

Results from our model confirms that higher prices of alcohol beverages mostly influence consumption of light and moderate drinkers. With rising number of standard drinks consumed price elasticity of all three beverages dropped to -0.35 for wine, -0.29 for beer and -0.39 for spirits.

The study confirmed that taxation of alcoholic beverages cannot be used as a single instrument for decreasing alcohol consumption, especially not heavy drinking. To achieve reducing of social and health consequences of heavy drinking there must be implied supporting tools like sales restrictions and bans on commercial focused on alcohol product and instead of them support campaigns against drinking.

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